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ABSTRACT

This study found no significant difference in student achievement as a result of change in identified teacher behaviors in an American History course. The behaviors were those identified in the Stanford Teacher Competence Appraisal Guide. Behavior change was effected through the use of a microteaching teach-reteach cycle with feedback from videotapes, results of Flanders Interaction Analysis, and a supervisor. The history teacher coordinated the development of lesson plans for the microteaching sequences so that all students would have similar experiences. One American History class of 28 students was used for the experiment. A table of random numbers was utilized in dividing the class into two teach and two reteach groups. Students were given nine tests during a 5 week period, with test items taken from "Teacher-Made Test Items in American History: Emphasis Junior High School." No significant differences were found in test results between the teach and reteach groups. (RT)

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THE STUDY OF STUDENT ACHIEVEMENT AS A RESULT OF MODIFICATION OF CERTAIN IDENTIFIABLE TEACHER BEHAVIORS

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SECTION I

THE PROBLEM AND PROCEDURE

This report describes an experiment to determine if utilizing a process which increases teacher performance of teaching competence in the micro-teaching phase of teacher training will result in increased student achievement.

Problem

The instructional system designed to produce teaching behavior as developed provides for (1) observation of the teacher's own performance; and (2) establishes a common frame of reference for evaluation of teacher performance.

The system includes television recordings of teaching sequences which are viewed at a later time, termed feedback, and a permanent appraisal utilizing an ability scale for identifiable teacher behavior.

Related Research

Changed teacher behavior can best be accomplished by including a cue discrimination in the feedback of a teaching sequence as shown by experiments at Stanford. Further experiments at Stanford suggest that wide variations in time of feedback do not produce differences in teacher behavior change. These two experiments were reported in Training Effects of Feedback and Modeling Procedures on Teaching Performance (McDonald and Allen, 1967).

The micro-teaching phase of teacher training for the experiment consisted of teaching an approved 10-15 minute lesson to a group of junior high students while being video taped. On the following day the teacher views himself teaching while being cued about his performance. The teacher then retaught the same lesson to another group of students while again being video taped. For the purpose of this experiment, minor variations in feedback presentations or time of feedback were not considered as having an effect on the results.

Video taping occurred in a micro-teaching studio wherein are located camera, microphone, and monitor. Through cable the sequences were taped in the audiovisual center from which they could be called up and observed at a later time. This permanent installation resulted from difficulties encountered when several teachers operated a portable recorder without the assistance of technical help.

The method used for giving a teacher information about his teaching performance was the Stanford Appraisal Guide of Teacher Competence. This guide establishes a common frame of reference for discussion. It was not the purpose of this experiment to test this guide or to modify it. It was assumed, with one person experienced in the rating of teachers, that this guide would omit the variable of differential cuing teaching sequences. For the purpose of this

study, the areas of aims, planning, and performance were utilized. The guide is included in Appendix A.

Hypothesis

For the experiment, the following Null-Hypothesis was formulated: Changed teacher behavior will not result in increased student achievement.

SECTION II

THE EXPERIMENT

The objective of the experiment was to ascertain whether changed teacher behavior resulted in increased student achievement. For the experiment the behaviors were those identified in the Stanford Teacher Competence Appraisal Guide and feedback was handled through replay of video taped sequences.

Teacher behavior was changed as will be shown. However, this study does not include a statistical study of this change but rather a study of the resulting student achievement.

The area of social studies was chosen because of available sources of test items in this area. Teacher-Made Test Items in American History: Emphasis Junior High School (Dana Kurfman, 1968) bulletin Number 40 by the National Council for the Social Studies was utilized for this study.

To the extent that the investigators were successful in utilizing this bulletin, there was provided then a basis for grading students which in turn provided a test for evaluation of the effectiveness of this instructional procedure.

One American History class of 28 students was utilized during the second semester of the 1968-69 school year for the experiment. A table of random numbers was utilized in dividing the class into two teach and two reteach groups.

Method

Teachers prepared sequences for micro-teaching in the subject of American History with the assistance of the history teacher. This allowed for coordination in the program so that teachers would provide similar experiences for all students. Teach and reteach groups were removed from the classroom to the micro-teaching studio for the prepared sequences which were video taped. Students were given nine tests during a five week period.

The college instructor managed the recording process, served as rater on the competence guide, and cued teachers while together viewing video taped sequences.

SECTION III

FINDINGS

Teacher Behavior Change

The pre-student teaching experience is composed of a semester course containing three general areas of work: exposition, micro-teaching, and observation experiences. For this experiment, a four cycle micro-teaching period followed five weeks of exposition. A total of 12 college student teachers thus provided for 24 teach-re-teach sessions or 48 teaching sessions of approximately 15 minutes duration each. Each teaching session was evaluated utilizing the Stanford Teacher Competence Appraisal Guide which allows rating in the following areas:

1. Clarity of aims
2. Appropriateness of aims
3. Organization of lesson
4. Selection of content
5. Selection of materials
6. Beginning of lesson
7. Clarity of presentation
8. Pacing the lesson
9. Pupil attention and participation
10. Ending the lesson
11. Teacher pupil rapport

In this experiment the four cycles are composed of a teaching situation followed by a review of the teacher rating while viewing a T.V. recording of the session. This is followed by a reteaching of the same lesson to another group of students. This is then repeated with a second lesson. One person, the college supervisor, rated all student teaching sessions. The rating scale is a seven point scale. The average of the ratings for the 11 areas are displayed in Table I. It appears that this seven point scale which is loaded with high values, in this case has overcome successfully the cultural bias of over rating. No trend is indicated in Table I other than the reteach rating is higher than the teach rating except in one case. In the case of teacher number 8 in phase II the teach rating was high and the process did not increase the teacher's rating; thus, his behavior for that teaching sequence was not changed.

If these averages of ratings of the 11 areas are presented as a distribution as in Figure I, however, it can be seen that the range of the distribution decreases as the cycle proceeds. The means of the distribution are teach I, 2.64; reteach I, 3.99; teach II, 3.24; reteach II, 4.10. There is then a progression of change in teacher behavior in the 11 areas listed. The highest overall rating in this study was at 5.00; the lowest at 1.36.

The twenty-four teach-reteach cycles were presented over a total of nine topics. A student test was designed for each topic. Teachers designed their lessons in conference with the history teacher. Objectives were behavioralized for each lesson. These conferences included content and materials selection. The history teacher selected test items.

	Reteach	3.54	3.54	4.27	4.54	3.90	4.09	4.00	4.00	4.09	4.72	4.27	4.27
II													
	Teach	3.09	3.18	3.00	2.90	3.81	3.27	3.81	4.00	2.81	2.63	3.54	2.90
	Reteach	2.81	3.63	5.00	4.81	4.36	2.36	4.63	3.36	4.00	3.90	4.18	4.90
I													
	Teach	2.63	2.54	2.87	4.00	2.72	2.27	2.96	2.55	1.36	2.81	1.81	3.18
	Student Teachers	1	2	3	4	5	6	7	8	9	10	11	12

Table I

Average Ratings for All Competencies

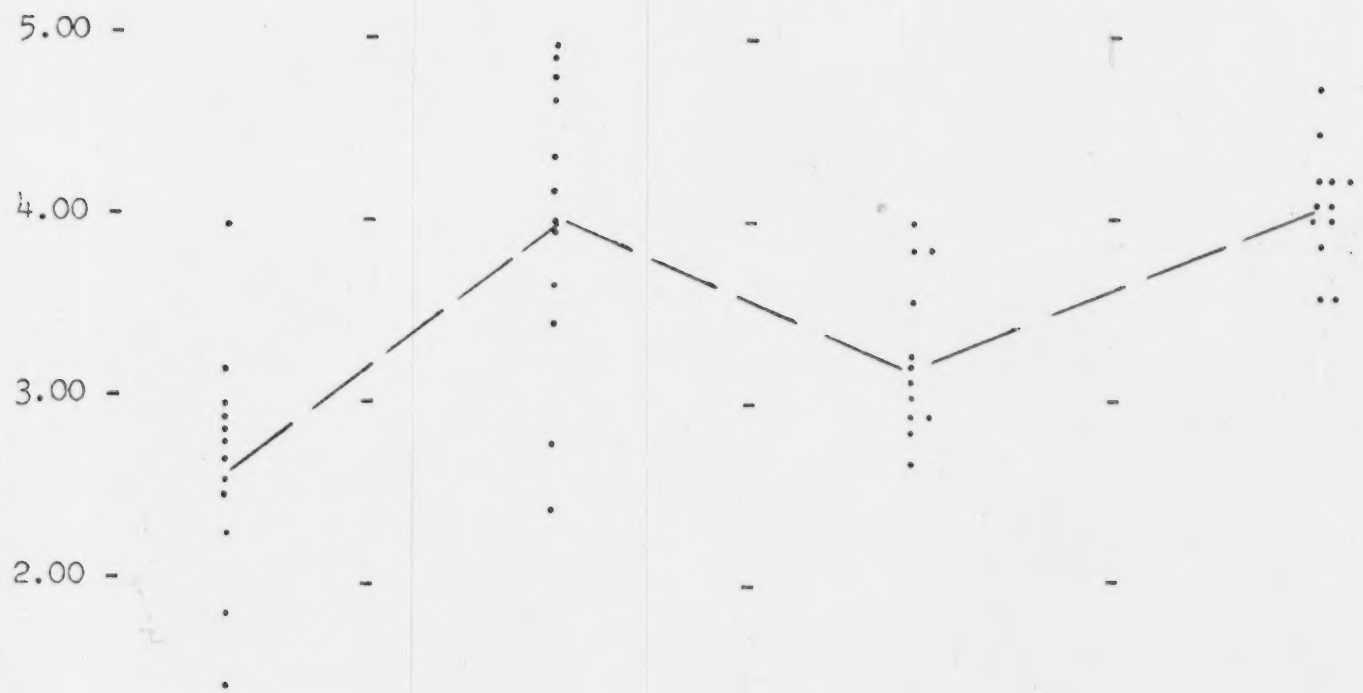

Figure I

Distribution of Average Competence Rating

In Table II, teacher ratings are displayed as the average of total points by teacher. The Stanford Teacher Competence Appraisal Guide for each teacher was counted for total points on all 11 areas. Teachers for each testing period were averaged. The overall result of the micro-teaching process was to change teacher behavior in every testing period. As can be seen the change is upward but the per cent of increase varied considerably. Therefore, the change of teacher behavior was not in the same range for each testing period. In terms of total points, teacher behavior points were changed by the micro-teaching process from a 3.58% to an 84.5% increase. The average percentage increase for all 9 testing periods was 35.2% more points in the 11 areas.

Average Total Points										
	Reteach	44.7	40.5	46.7	48.5	41	44.5	43.5	41	49.5
	Teach	32	28.8	25.3	34.5	34.5	40	42	35	30.5
		1	2	3	4	5	6	7	8	9

Testing Periods

Table II

Average Total Points of 11 Rated Areas for 9 Testing Periods

Table III displays the total points per area for the 7 point scale. A total of 264 tallies each were possible for the teach and reteach sessions, or 24 tallies for each of the 11 areas. The distribution of these tallies were not statistically treated. However, from the general appearance of the distribution, it seemed that one could conclude that the distribution had moved about one scale point between the teach and reteach sessions.

Competence Categories									
Reteach	1	1		3	17	3		24	
	2	1		5	15	3		24	
	3		1	3	17	3		24	
	4			4	15	5		24	
	5			3	16	5		24	
	6		1	3	11	6	3	24	
	7			6	12	6		24	
	8		1	3	16	3	1	24	
	9	1	1	1	11	7	3	24	
	10		1	2	10	9	2	24	
	11			6	9	8	1	24	
Subtotal		3	5	39	149	58	10	264	Total
Competence Categories									
Teach	1		2	3	16	3			24
	2		3	2	16	3			24
	3		1	7	11	5			24
	4			5	15	4			24
	5			4	15	5			24
	6		6	4	9	5			24
	7		2	4	12	6			24
	8		2	4	10	8			24
	9		2	6	10	6			24
	10		1	4	11	7	1		24
	11			1	17	6			24
Subtotal			19	44	142	58	1		264 Total
		0	1	2	3	4	5	6	7

Competence Rating

Table III

Competence Rating Distribution

Flanders Interaction Analysis

As a second measure of class interaction, Flanders Interaction Analysis was utilized. All student teachers were instructed in Flanders Interaction Analysis and other forms of measuring classroom behavior during the exposition phase of the course. A summary of categories for Flanders Interaction Analysis is located in Appendix B.

An analysis was made for each teach and reteach session for both phase I and II. A total of 48 analyses were made. A matrix was prepared for each set of data and areas reported.

The areas analyzed were the extended indirect, the content cross , the extended direct, and student talk. These areas are identified in Appendix C. The areas were reported by computing tallies in each area as a percent of total tallies. Two additional computations were made, the I/D ratio computed by dividing the totals in columns 1-4 by the totals in columns (1-4) and (5-7), and the revised I/D ratio computed by dividing the totals in columns 1-3 by the totals in columns (1-3) and (6-7). Table IV was developed to present percentages of total tallies for each area or interaction ratios and their average. The average percent or ratio for the entire unit was utilized for the following analysis.

The extended indirect increased from the teach to reteach phase. However, in both cases it appears that the very powerful means of motivating students by using their ideas, accepting their ideas and developing their ideas was not used.

The content cross analysis reveals a slight decrease in content emphasis from the teach to the reteach phase. Both percentages are well below national averages.

The extended direct was low in each case indicating there were no discipline problems.

The I/D increased slightly from the teach to the reteach phase. More indirect teacher behavior was being used in the reteach phase.

The revised I/D was nearly 1 in both phases due to an almost consistent absence of tallies in the 6, 7 columns. Few if any directions or criticisms were given.

Student talk increased from 30.8% to 31.2% from the teach to the reteach phase. This percentage compares favorably with national research but there was little change from the teach to the reteach phase.

Flanders Interaction Analysis was not used in the cuing process. Overall there was little change in averages from the teach to the reteach phase.

TEACH

	1	2	3	4	5	6	7	8	9	Average
Extended Indirect	2.93	4.17	.85	1.05	1.45	3.1	1.67	.855	2.95	.914%
Content Cross	63.55	75.5	71.2	76.0	62.5	70.0	69.95	64.5	65.0	68.6%
Extended Direct	0	0	.35	0	0	0	0	0	0	.04%
I/D	.289	.375	.365	.349	.334	.558	.488	.600	.710	.452
Revised I/D	.945	.836	.930	1	.93	1	.845	.925	.825	.914
Student Talk	36.1	19.5	28.0	26.4	35.2	28.5	38.6	34.4	30.2	30.8%

Testing Periods

RETEACH

	1	2	3	4	5	6	7	8	9	Average
Extended Indirect	.38	1.0	0	2.1	3.35	1.54	1.8	.40	3.42	1.55%
Content Cross	70.0	82.2	71.6	75.0	56.5	66.5	57.0	59.6	68.4	67.4%
Extended Direct	0	0	0	0	0	0	0	2.4	.24	.28%
I/D	.485	.35	.465	.543	.492	.531	.426	.551	.635	.497
Revised I/D	1	1	1	.94	1	1	.815	.64	.87	.919
Student Talk	33.5	16.45	29.1	28.4	37.2	27.5	39.5	40.6	28.5	31.2%

Testing Periods

TABLE IV

Results of Matrix Totals

Student Achievement

Questions for the 9 testing periods were selected after objectives were carefully formulated. Student teachers organized lessons around these behavioralized objectives and the campus laboratory instructor formulated and selected the test items. The bulletin Teacher-made Test Items in American History: Emphasis Junior High School, by Dana Kurfman, was utilized in this process.

A 5 week unit was organized and 9 tests devised for the 9 testing periods. Per cent of total correct was computed and can be found displayed in Table V.

The table of random numbers, found in Elementary Statistical Methods by Paul Blommers, was utilized in dividing the class into teach and reteach sections and to divide each of these sections into two groups. This then provided 7 students for each microteaching session. This number was selected to conform to other microteaching situations throughout the country.

The hypothesis as earlier stated calls for a test of the assumption of no change in student achievement between the two groups, teach and reteach. Because scores were to be reported as per cents, a 6 per cent difference was selected as to be a significant change in student achievement. The unit was 5 weeks in length and although 9 tests were given throughout the unit they were considered as a unit test. The variability of individual tests was not considered as offering evidence but rather the overall results. The average score for the test group was 69.8 per cent whereas that of the retest group was 70.9 per cent. The hypothesis as earlier stated is thus retained.

Teach Student Number	1	2	3	4	5	6	7	8	9
1	63		89		43	80		100	
2	50		89					75	
3			89		71	90		75	
4								88	
5	88		78			70		75	
6	88		89		43	70		100	
7	63				14	40		63	
8		50		70			100		90
9		50		50			67		80
10		80		80			83		90
11							83		80
12		80					100		50
13		60					83		80
14		50					67		

Reteach Student Number	1	2	3	4	5	6	7	8	9
1				60			67		90
2		70					67		90
3		50		70					
4		70							
5		90					67		100
6		60					83		30
7		30		80			83		60
8	63		67		71	50		50	
9	50		89		57	40		88	
10	75		100		71	70		100	
11	75				86	70		88	
12			67		43	70		50	
13			89			80		100	
14	75		89		86	70		50	

Test Number

Table V

Student Percentage Test Scores

SECTION IV

CONCLUSIONS

Conclusions

Although no statistical analysis was made of the microteaching process, it is clear that as in the case of experiments at Stanford University the process of a teacher viewing his teaching while being cued about it is a most effective feedback of the teaching session; teacher behavior is changed.

An interaction analysis was recorded for each teach and reteach session. However, they were not utilized as feedback. The analysis is not present as support of the appraisal guide but yet another way of observing the actual classroom situation.

The total population of students available was utilized and results are confined to this population of students. For this group of students in this teaching situation for the unit on American History used, there was no difference in student achievement as a result of change in teacher behavior as identified.

Several questions can be identified for further research. Among these are: (1) How much change in teacher behavior can result from the microteaching process; (2) How much change in teacher behavior will result in observable significant student increase in achievement; (3) What are some other student changes as a result of changed teacher behavior, and (4) What is the unit length required for observable change in student achievement.

Because it was observed that teacher reaction to the microteaching process varied, perhaps a level of achievement necessary for advancement in the teacher training program can be identified and the frequency of feedback identified.

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APPENDIX A

THE RATER'S FORM

STUDENT TEACHER _____
DATE _____
LESSON _____
OBSERVED BY _____

	OBSERVATION NOTES:	Unable to observe 0	Weak 1	Below Average 2	Average 3	Strong 4	Superior 5	Outstanding 6	Truly Exceptional 7
AIMS									
1. Clarity of Aims									
2. Appropreateness of Aims									
PLANNING									
3. Organization of Lesson									
4. Selection of Content									
5. Selection of Materials									
PERFORMANCE									
6. Beginning of Lesson									
7. Clarity of Presentation									
8. Pacing the Lesson									
9. Pupil Attention and Participation									
10. Ending the Lesson									
11. Teacher Pupil Rapport									

STANFORD TEACHER COMPETENCE APPRAISAL GUIDE

APPENDIX B

SUMMARY OF CATEGORIES FOR INTERACTION ANALYSIS

APPENDIX B

SUMMARY OF CATEGORIES FOR INTERACTION ANALYSIS

Summary of Categories for Interaction Analysis

INDIRECT TEACHER INFLUENCE

1.c. Clarifies student feelings (cause and effect)
r. Refers to student feelings (refers to an emotion)

2. Praise - all right, fine, good (repeats right answer)
P. Praise using public criteria (Webster, etc.)
p. Praise using private criteria "I like the way you answered that question."

3.c. Clarifies student ideas
r. Refers to student ideas - "Johnny made a point yesterday."
s. Summarizes student ideas

4.f. Asks factual questions (8's,usually are either correct or incorrect)
c. Asks convergent questions-comparison-contrast-procedure
d. Asks divergent questions (9's, speculative-creative thinking)
e. Asks evaluative questions (9's, judgment, value, worth, opinion)

- -

DIRECT TEACHER INFLUENCE

5.M. Motivational lecture-"our science unit should interest you because we'll raise gerbils."
o. Orientational lecture-"We'll observe the gerbils and record their feeding habits."
i. Informational lecture-"Gerbils are natives of Australia."
p. Personal lecture-"I particularly enjoy gerbils because they are so curious."

6.i. Instructional Direction-"Open your books to page 6."
M. Managerial Direction-"Put your coats on, line up for recess, arrange desks, etc."

7. Criticism
P. Criticism using Public criteria
p. Criticism using private criteria

- -

STUDENT TALK

8.f. Factual student response (predictable)
c. Convergent student response (predictable)

9.d. Divergent student response (unpredictable)
e. Evaluative student response (unpredictable)
i. Initiative student talk (unpredictable)

- -

10.s. Silence
c. Confusion
M. Miscellaneous

APPENDIX C

THE MATRIX

THE MATRIX

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
Total	←	Indirect		→	←	Direct		→		
%										

Content cross

Extended direct

Extended Indirect

Student Talk